



AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

- 1 1. (Currently amended) A method to facilitate cache coherence with
2 adaptive write updates, comprising:
 - 3 initializing a cache to operate using a write-invalidate protocol;
 - 4 monitoring a dynamic behavior of the cache during program execution;
 - 5 and
 - 6 ~~switching the cache to operate if the dynamic behavior indicates that better~~
7 ~~performance can be achieved using a write-broadcast protocol, if the dynamic~~
8 ~~behavior indicates that better performance can be achieved switching the cache to~~
9 ~~operate using the write-broadcast protocol.~~
- 1 2. (Original) The method of claim 1, wherein monitoring the dynamic
2 behavior of the cache involves monitoring the dynamic behavior of the cache on a
3 cache-line by cache-line basis.
- 1 3. (Original) The method of claim 2, wherein switching to the write-
2 broadcast protocol involves switching to the write-broadcast protocol on a cache-
3 line by cache-line basis.
- 1 4. (Original) The method of claim 1, wherein monitoring the dynamic
2 behavior of the cache involves maintaining a count for each cache line of the

3 number of cache line invalidations the cache line has been subject to during
4 program execution.

1 5. (Original) The method of claim 4, wherein if the number of cache line
2 invalidations indicates that a given cache line is updated frequently, switching the
3 cache line to operate under the write-broadcast protocol.

1 6. (Original) The method of claim 5, wherein if a given cache line is using
2 the write-broadcast protocol and the number of cache line updates indicates that
3 the given cache line is not being contended for by multiple processors, switching
4 the given cache line back to the write-invalidate protocol.

1 7. (Currently amended) The method of claim 4, wherein if a shared the
2 shared memory multiprocessor includes modules that are not able to switch to the
3 write-broadcast protocol, the method further comprises locking the cache into the
4 write-invalidate protocol.

1 8. (Original) The method of claim 1, wherein the write-invalidate protocol
2 sends an invalidation message to other caches in a shared memory multiprocessor
3 when a given cache line is updated in a local cache.

1 9. (Currently amended) The method of claim 1, wherein the write-
2 broadcast protocol broadcasts an update to other other caches in a shared memory
3 multiprocessor when the given cache line is updated in a local cache.

1 10. (Currently amended) An apparatus to facilitate cache coherence with
2 adaptive write updates, comprising:

3 an initializing mechanism configured to initialize a cache to a write-
4 invalidate protocol;
5 an monitoring mechanism configured to monitor a dynamic behavior of
6 the cache; and
7 | a protocol switching mechanism configured to switch the cache to a write-
8 broadcast protocol if the dynamic behavior indicates that better performance can
9 be achieved using the write-broadcast protocol.

1 11. (Original) The apparatus of claim 10, wherein monitoring the dynamic
2 behavior of the cache involves monitoring the dynamic behavior of the cache on a
3 cache-line by cache-line basis.

1 12. (Original) The apparatus of claim 11, wherein switching to the write-
2 broadcast protocol involves switching to the write-broadcast protocol on a cache-
3 line by cache-line basis.

1 13. (Original) The apparatus of claim 10, wherein monitoring the dynamic
2 behavior of the cache involves maintaining a count of cache line invalidations
3 initiated by each processor within a shared memory multiprocessor.

1 14. (Original) The apparatus of claim 13, wherein if the count of cache line
2 invalidations indicates that a given cache line is updated frequently in different
3 caches of the shared memory multiprocessor, switching the cache to the write-
4 broadcast protocol.

1 15. (Original) The apparatus of claim 14, wherein if the given cache line is
2 using the write-broadcast protocol and the count of cache line invalidations

3 indicates that the given cache line is being invalidated in only one cache,
4 switching the cache to the write-invalidate protocol.

1 16. (Original) The apparatus of claim 13, further comprising a locking
2 mechanism configured to lock the cache into the write-invalidate protocol if the
3 shared memory multiprocessor includes modules that are not able to switch to the
4 write-broadcast protocol.

1 17. (Original) The apparatus of claim 10, wherein the write-invalidate
2 protocol involves sending an invalidate message to other caches within a shared
3 memory multiprocessor when a given cache is written to.

1 18. (Original) The apparatus of claim 10, wherein the write-broadcast
2 protocol involves broadcasting a data update message to other caches within a
3 shared memory multiprocessor when a given cache is written to.

1 19. (Currently amended) A computing system that facilitates cache
2 coherence with adaptive write updates, comprising:
3 a plurality of processors, wherein a processor within the plurality of
4 processors includes a cache;
5 a shared memory;
6 a bus coupled between the plurality of processors and the shared memory,
7 wherein the bus transports addresses and data between the shared memory and the
8 plurality of processors
9 an initializing mechanism configured to initialize the cache to a write-
10 invalidate protocol;
11 a monitoring mechanism configured to monitor a dynamic behavior of the
12 cache; and

13 a protocol switching mechanism configured to switch the cache to a write-
14 broadcast protocol if the dynamic behavior indicates that better performance can
15 be achieved using the write-broadcast protocol.

1 20. (Currently amended) A means to facilitate cache coherence with
2 adaptive write updates, comprising:

3 3 an initializing a-means for initializing a cache to a write-invalidate
4 protocol;
5 5 a monitoring means for monitoring a dynamic behavior of the cache; and
6 6 a protocol switching means for switching the cache to a write-broadcast
7 protocol if the dynamic behavior indicates that better performance can be
8 achieved using the write-broadcast protocol.